

glabrous, bearing a few amber-colored glands and numerous lenticels; leaves simple; petioles 0.5--1 cm. long, sparsely pubescent and glandular; leaf-blades chartaceous, ovate or elliptic, 3--8 cm. long, 2--4 cm. wide, brownish above and gray-brown beneath in drying, apically acute or obtuse to obtusely apiculate, marginally entire, basally somewhat attenuate or often rounded, glabrous on both surfaces except for the slightly pubescent venation, with sessile amber-colored glands beneath; midrib conspicuous above, prominent beneath; secondaries 7--9 pairs, prominent beneath, parallel, arcuately joined within the margins; inflorescence terminal, 10--22 cm. long, basally 6--10 cm. wide, sparsely spinulose, pubescent, glandular; bracts 1--3 mm. long; calyx 2--5 mm. long, glabrous, the rim truncate or sinuate-lobulate, glandulose; corolla hypocrateriform, externally glabrous and glandular, the tube about 5.5 mm. long, internally glabrous except for the lightly pubescent stamen-insertion area, the limb bilabiate, the posterior lip 2 mm. long and bilobed, the anterior (inferior) lip 5 mm. long, 3 lobed, the lobes apically rounded; stamens 4, inserted 2 mm. above the base of the corolla-tube; filaments 5--7 mm. long; anthers 0.75 mm. long; style 7.5 mm. long; stigma apically bilobed; ovary globose, 1 mm. long and wide, glabrous, apically glandulose; fruit obovoid, about 7 mm. long, glabrous, rugose in drying, apically sparsely glandulose.

The species is based on *Kerr 7002* from riverbanks at Supan Dom Bang, at about 20 m. altitude, Nakawn Chaisi, Thailand. Fletcher cites also *Kerr 19329*, *Marcan 1004*, and *Put 2573* from waste ground and evergreen forests along a stream, at an altitude of 6 m. to "under 50 m.", from Prachinburi and Ayuthia provinces in Thailand. Nothing further is known to me of this species.

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NOTES ON THE GENUS *PETRAEOVITEX* (VERBENACEAE)

Harold N. Moldenke

In view of Munir's excellent review of this genus in 1965, it would be presumptuous on my part now to continue on the detailed monograph of the genus which it was my intention to publish and on which work was begun in 1931. Still, the bibliographic and other notes which have been assembled by my wife and myself over these many years probably should be placed on record. This is the 59th genus so treated by me since the beginning of this series in 1930. The herbarium acronyms employed herein are the same as I have used in all previous installments in this series of notes in this journal since 1931 and are fully explained in my Fifth Summary (1971), pages 795 to 801, and elsewhere.

PETRAEOVITEX Oliv. in Hook., Icon. Pl. 15: 15--16, pl. 1420. 1883.

Synonymy: *Petreovitex* Oliv. apud H. Hallier, Meded. Rijks Herb. Leid. 37: 84. 1918. *Letraeovitex* [Merr.] ex Fedde & Schust., Justs Bot. Jahresber. 59 (2): 417, sphalm. 1939. *Petraeovitex* Sinclair ex Mold., Résumé Suppl. 13: 7, in syn. 1966.

Bibliography: Rumpf, Herb. Amboin. 5: 4, pl. 3. 1747; J. E. Sm. in Rees, Cyclop., ed. 2, 27: *Petrea* no. 2. 1814; Schau. in A. DC., Prodr. 11: 620. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 338. 1858; Hassk., Neue Schl. 89. 1866; Oliv. in Hook., Icon. Pl. 15: 15--16, pl. 1420. 1883; Hemsl. in Thompson & Murray, Rep. Scient. Res. Voy. Challenger 3, Bot. 1: 110. 1885; Fawcett in Forbes, Wander. 2: 225. 1886; K. Schum. & Hollr., Fl. Kais. Wilhelmsl. 122. 1889; Warb., Engl. Bot. Jahrb. 13: [Pl. Pap.] 427. 1891; F. Muell., Bot. Centralbl. 50: 195. 1892; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 2: 497. 1894; Briq. in Engl. & Prantl., Nat. Pflanzenfam. 4 (3a): 177 & 179 (1895) and 4 (3a): 383. 1897; K. Schum., Notizbl. Bot. Gart. Berlin 2: 145. 1898; K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Sddsee 527. 1900; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 1, 322. 1903; Dalla Torre & Harms, Gen. Siphonog., imp. 1, 433. 1904; E. D. Merr., Journ. Philip. Sci. Bot. 2: 425. 1907; Gamble in King & Gamble, Journ. Asiat. Soc. Beng. 74 (2 extra): 858--860. 1908; King & Gamble, Kew Bull. Misc. Inf. 1908: 113--114. 1908; King & Gamble, Mat. Fl. Malay Penins. 4: 1068 & 1069. 1909; Pulle in Lorentz, Nova Guinea 8 (2): 403 (1910) and 8 (4): 687. 1912; Prain, Ind. Kew. Suppl. 4, imp. 1, 177. 1913; Heyne, Nutt. Plant. Nederl. Ind., ed. 1, 4: 123 & xviii. 1917; E. D. Merr., Interpret, Rumph. Herb. Amboin. 453--454. 1917; H. Hallier, Meded. Rijks Herb. Leid. 37: 84--86. 1918; Trelease, Bot. Centralbl. 138: 123. 1918; H. J. Lam, Verbenac. Malay. Arch. 323--329 & 366. 1919; H. J. Lam in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 97--99 & xiv. 1921; Fedde, Justs Bot. Jahresber. 45 (1): 552. 1923; Fedde & Schust., Justs Bot. Jahresber. 45 (1): 149. 1923; E. D. Merr., Journ. Malay Br. Roy. Asiat. Soc. 1: 30. 1923; E. D. Merr., Enum. Born. Pl. 518. 1921; E. D. Merr., Enum. Philip. Flow. Pl. 3: 406. 1923; Ridl., Fl. Malay Penins. 2: 611 & 637. 1923; H. J. Lam in Lauterb., Engl. Bot. Jahrb. 59: 97--98. 1924; H. J. Lam in Lam & Bakh., Nova Guinea 14 [Bot. 1]: 172. 1924; Heyne, Nutt. Plant. Nederl. Ind., ed. 2, 4: 1324. 1925; Wangerin, Justs Bot. Jahresber. 53 (2): 644. 1925; A. W. Hill, Ind. Kew. Suppl. 6: 150. 1926; Wangerin, Justs Bot. Jahresber. 46 (1): 717. 1926; Fedde, Justs Bot. Jahresber. 46 (2): 655. 1929; A. W. Hill, Ind. Kew. Suppl. 7: 183. 1929; E. D. Merr., Univ. Calif. Publ. Bot. 15: 267. 1929; Funke, Ann. Jard. Bot. Buitenz. 41: pl. 15, fig. 13. 1930; Wangerin, Justs Bot. Jahresber. 50 (1): 237. 1930; Stapf, Ind. Lond. 5: 39. 1931; Fedde & Schust., Justs Bot. Jahresber. 53 (1): 1074--1075. 1932; A. W. Hill, Ind. Kew. Suppl. 8: 178. 1933; Junell, Symb. Bot. Upsal. 1 (4): 95--97 & 202, fig. 145--147. 1934; Bakh., Journ. Arnold Arb. 16: 73. 1935; Mold., Feddes Repert. Spec. Nov. 43: 209. 1938; Fedde & Schust., Justs Bot.

Jahresber. 59 (2): 417. 1939; Mold., Suppl. List Comm. Vern. Names 9 & 21. 1940; Mold., Prelim. Alph. List Inv. Names 26, 34, & 35. 1940; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 2, 322. 1941; Worsdell, Ind. Lond. Suppl. 2: 214. 1941; Kaneh. & Hatus., Bot. Mag. Tokyo 56: 114--115. 1942; Mold., Alph. List Inv. Names 24 & 35. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 57, 60, 61, 63--68, 70, & 97. 1942; Mold., Phytologia 2: 108. 1944; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 2: 477. 1946; Mold., Alph. List Inv. Names Suppl. 1: 18. 1947; H. N. & A. L. Mold., Pl. Life 2: 34, 58, 78, & 82. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 133, 139, 144--150, 155, 162, & 192. 1949; J. Sinclair, Gard. Bull. Singapore 15: 18. 1950; Mold., Biol. Abstr. 25: 3051. 1951; Mold., Phytologia 3: 421 (1951) and 4: 368. 1953; Anon., Biol. Abstr. 25: 4066. 1954; Angely, Cat. Éstat. Gen. Bot. Fan. 17: 5. 1956; J. Sinclair, Gard. Bull. Singapore 15: 18, fig. 2. 1956; Deight., Sydowia 11: 42. 1958; Iljin, Acad. Sci. Bot. Inst. Dept. Repr. Mat. Hist. Fl. Veg. USSR 3: 216. 1958; Prain, Ind. Kew. Suppl. 4, imp. 2, 177. 1958; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 3, 322. 1959; Mold., Résumé 180, 187, 188, 190, 192, 193, 197, 199, 201, 202, 204, 207, 211, 220, 295, 332, 333, & 464. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 2: 477. 1960; Turrill, Curtis Bot. Mag. 173: pl. 355. 1960; Hansford, Ann. Myc., ser. 2, Beih. 2: 689--690. 1961; Mold., Phytologia 8: 393. 1962; Mold., Résumé Suppl. 3: 24 & 34. 1962; Dalla Torre & Harms, Gen. Siphonog., imp. 2, 433. 1963; Townsend, Excerpt. Bot. A.6: 462. 1963; Van Steenis, Fl. Males. Bull. 19: 1113. 1964; F. A. Barkley, List Ord. Fam. Anthoph. 76 & 196. 1965; Meijer, Bot. News Bull. Forest Dept. Sandakan 4: 29. 1965; Munir, Gard. Bull. Singapore 21: 215--257, pl. 1--4, maps 1--4, fig. 1--15. 1965; Munir, Biol. Abstr. 47: 4169. 1966; Airy Shaw in J. C. Willis, Dict. Flow. Pl., ed. 7, 856. 1966; Anon., Biol. Abstr. 47 (10): S.104 & S.123. 1966; Mold., Résumé Suppl. 13: 5--7. 1966; G. Taylor, Ind. Kew Suppl. 13: 102. 1966; Whitmore, Guide Forests Brit. Solom. Isls. 152 & 195. 1966; Mold., Résumé Suppl. 15: 15. 1967; Van Steenis-Krusem., Fl. Males. Bull. 4: 1113, 1293, & lxi. 1967; Meijer, Bot. Bull. Herb. Forest Dept. Sabah 10: 222. 1968; Keng, Ord. Fam. Malay. Seed Pl. 278. 1969; Menninger, Flow. Vines 408. 1970; Mold. in Menninger, Flow. Vines 337. 1970; Rouleau, Guide Ind. Kew. 144 & 352. 1970; G. Taylor, Ind. Kew. Suppl. 14: 102. 1970; Balgooy, Blumea 6: [Pl. Geogr. Pacif.] 200. 1971; Mold., Fifth Summ. 1: 305, 317, 325, 330, 332, 333, 337, 339, 340, 350, 351, & 366 (1971) and 2: 519, 597--599, 764, 775, 794, & 897. 1971; Foreman, Div. Bot. Dept. For. N. Guin. Bot. Bull. 3: 63. 1972; Mold., Phytologia 23: 434 & 509 (1972) and 25: 508 & 509. 1973; Airy Shaw in J. C. Willis, Dict. Flow. Pl., ed. 8, 879. 1973; Gibbs, Chemotax. Flow. Pl. 3: 1752. 1974; Balgooy, Pacif. Pl. Areas 3: 244--245. 1975; Mukherjee & Chanda, Trans. Bose Res. Inst. 41: 40, 44, & 47. 1978; Mold., Phytologia 44: 219 & 510 (1979) and 46: 50, 124, 166, 170, 171, 464, 465, & 509. 1980.

Usually climbing shrubs, sometimes creeping or scrambling; branches and branchlets tetragonal; leaves decussate-opposite, ex-

stipulate, deciduous, petiolate, usually compound and trifoliate, sometimes twice trifoliate, rarely unifoliate; leaflets usually 3--6, sessile or petiolulate, glabrous or pubescent; inflorescence terminal, compound and pyramidal-paniculate, loose (with long-pedicellate flowers) to densely congested (with very short-pedicellate flowers), or axillary and cymose; bracts and bractlets usually small or even subulate during anthesis, sometimes colored, sometimes later developing into normal green leaves; flowers small and inconspicuous to larger and more conspicuous, subsessile to long-pedicellate; calyx very small, inferior, gamopetalous, short-tubular or campanulate, the rim regularly 5-dentate, the lobes much enlarged, membranous, costate, and reticulate-venose in fruit, finally elongate, rigid, oblanceolate, and usually apically obtuse; corolla gamopetalous, zygomorphic, obliquely hypocrateriform, posteriorly split, the limb expanded, more or less distinctly bilabiate, with 5 subequal apically obtuse and incurved lobes; stamens 4, epipetalous, subequal or subdidynamous, alternate with and longer than the corolla-lobes or sometimes included; anthers small, dorsifixed, 2-celled, the thecae elliptic-oblong (usually on included stamens) or more or less orbicular (usually on exserted stamens); pistil bicarpellary; style single, slender, terminal or excentric; stigma terminal, bilobed or bifid, the lobes equal or unequal; ovary compound, superior, obovoid, imperfectly 2-celled, 2-ovulate; ovules pendulous, attached to a central placenta; fruit capsular, subcylindric or 4-lobed, usually longitudinally striate, apically conic or truncate, sometimes constricted and then produced into a short, truncate, and faintly 4-lobed apex, sometimes much elongated into a long neck (rostrate), basally narrowed, 2- (or by abortion 1-) seeded; seeds 1 to 4, exalbuminous.

Type species: *Petraeovitex riedelii* Oliv. [= *P. multiflora* (J. E. Sm.) Merr.].

This is a small genus of about a dozen species and varieties, native to hot and moist tropical regions from the Philippine Islands and Malaysia to Indonesia, the Bismark Archipelago, the Molucca Islands, New Guinea, and the Solomon Islands; sometimes grown in cultivation as specimen plants.

Hallier (1918) "corrected" the orthography of the generic name to *Petreovitex* because, he maintained, *Petrea*, rather than the later spelling *Petraea*, is the correct orthography of the genus whose name was adopted as the first part of the new name and of whose fruits those of the present genus are reminiscent. Wangerin (1926) went along with Hallier in this contention.

Petraeovitex is usually regarded as a member of Tribe *Caryopterideae* (Schau.) Benth. in Subfamily *Viticoideae* Briq. of the *Verbenaceae* J. St.-Hil. along with *Caryopteris* Bunge, *Garrettia* Fletcher, *Glossocarya* Wall., *Peronema* Jack, and *Hymenopyramis* Wall., But Junell (1934) removes it from this tribe, along with *Peronema* and *Hymenopyramis*, and places it in Tribe *Viticeae* (Bartl.) Benth. To justify this change, he says: "Der Fruchtknotenbau ist gleichartig mit dem bei den übrigen Gattung innerhalb

Viticeae.....Der Fruchtknoten von *P. trifoliata* ist stark abgeplattet.....Die Fruchtknotenwand müsste sicher mit den Fruchtblatträndern in Kontakt stehen. Längsschnitte des Fruchtknotens erhalten natürlich bei dieser Art ganz verschiedenes Aussehen, je nachdem sie median oder transversal verlaufen.....Die Samenanlagen sind, wie auch bei *P. Riedelii*, sehr hoch inseriert.

"Bei *P. trifoliata* verwachsen die Plazenten unmittelbar unter den Samenanlagenbefestigungen. Bei *P. Riedelii* erfolgt die Verwachsung etwas weiter unten. Die eigentlichen Fruchtblattränder bleiben bei dieser Verwachsung frei; sich verwachsen auch nicht mit den mittleren Partien der Fruchtblattränder.

"Wie schon oben erwähnt, weicht diese Gattung von den vorhergehenden dadurch ab, dass die Frucht keine Steinfrucht ist. Meines Erachtens liegen jedoch keine Gründe dafür vor, diese Frucht als kapselartig zu bezeichnen, da das einzige Motiv für diese Bezeichnung darin liegt, dass die Fruchtwand trocken ist. Die Frucht zerfällt aber nicht in vier Klappen, was ja für *Caryopteridoideae* charakteristisch wäre. Die Frucht von *P. trifoliata* ist verhältnismässig gross (etwa 5 mm), zylindrisch bis schwach konisch, oben etwas breiter. An ihrer Oberfläche kann man nicht die Grenzen der einzelnen Klappen sehen oder unterscheiden, wie vielsamig sie ist. Von zwei Früchten, die ich untersuchte, war die eine zwei- und die andere einsamig. King & Gamble.....geben bei der Beschreibung von *P. Scortechinii* und *P. bambusetorum* an, dass die Frucht zwei- bis einsamig ist. Lam.....führt dies als Merkmal für die Gattung an. Bei *P. Riedelii* hingegen glaube ich drei bis vier Samen in jeder Frucht beobachtet zu haben. Bei dieser Art sind die Früchte klein, und obwohl ich mehrere verschiedene Herbarexemplare untersucht habe, konnte ich keine mit gut erhaltenen Früchten finden. Auch bei dieser Art zerfällt die Frucht nicht."

Briquet (1895) and Dalla Torre & Harms (1904) regarded this genus as monotypic; Angely (1956) regards it as having 7 species. Gibbs (1974) reports saponins absent (or probably so) in the genus. Deighton (1958) and Hansford (1961) report a fungus, *Meliola petraeovitidis* Deight. on the leaves of an unidentified species of *Petraeovitea*, based on Johnston 1648 [IMI.63958] from Malaya.

It is perhaps worth noting here that the Schumann & Lauterbach (1900) reference in the bibliography of this genus is often cited as "1901". Similarly, the Briquet (1895) reference is often cited as "1894", but apparently, according to Stafleu, incorrectly so.

The Kodoh & Aban SAN.82030, distributed as a *Petraeovitea* sp., actually is *Sphenodesme involucreata* (Presl) B. L. Robinson, while Ampuria SAN.40828 is *S. stellata* Merr., Lantoh SAN.82390, Meijer SAN.38796, J. Singh SAN.39260, and Tarodop SAN.83610 are *S. triflora* Wight, Talip SAN.68320 is *S. triflora* var. *montana* Munir, and C. B. Robinson 1423 is *Porana volubilis* Burm. f. in the *Convolvulaceae*. Gillespie 2953 & 4164 (nos. 1599951 & 1599952 in the United States National Herbarium), from Viti Levu in the Fiji Islands, distributed as *Vitex negundo* L., are not a *Vitex* and have the general habital aspect of a *Petraeovitea*.

Lam (1924) lists the following as unidentified but possible

collections of *Petracovitex*: Lauterbach 777, Nyman 245, & Wiesen-thal 66, all from New Guinea.

The following key to the accepted taxa is taken, with minor alterations, from Munir (1965):

1. Flowers in cymes borne on specialized floriferous branches, with or without green- or grayish-colored bracts.
2. Leaves twice trifoliolate.
3. Calyx-lobes externally tomentose, internally glabrous (except in var. *pubescens*); corolla villous in the throat; stamens & style subequal; anther thecae rotund.
4. Leaflets glabrous on both surfaces, entire, to 11 cm. long; calyx-lobes internally glabrous...*P. multiflora*.
- 4a. Leaflets pubescent on both surfaces, often irregularly dentate, to 4.5 cm. long; calyx-lobes internally puberulent.....*P. multiflora* var. *pubescens*.
- 3a. Calyx-lobes tomentose on both surfaces; corolla throat glabrous; style nearly twice as long as the stamens; anther thecae oblong or elliptic; leaflets to 4.5 cm. long.....*P. sumatrana*.
- 2a. Leaves 1- or 3-foliolate.
5. Inflorescence with many foliaceous bracts, the ultimate branchlets with many linear bracteoles even without flowers in their axils; pedicels about 5 mm. long; flowers numerous, congested.
6. Fruit apically short-conic or abruptly narrowed into a neck (rostrate); style always terminal; stigma equally bilobed; ovary pubescent only on the upper 1/3, not glanduliferous; stamens & style much exserted; anther thecae orbicular or suborbicular; leaflets glabrous.
7. Leaflets rhombic-elliptic, shiny on both surfaces, generally widest below the middle, apically acuminate, basally cuneate or subcuneate; middle leaflet to 15 cm. long & its petiolule to 3.5 cm. long; fruit abruptly long-rostrate.....*P. kinabaluensis*.
- 7a. Leaflets elliptic-ovate, dull, generally widest below the middle, basally rounded or subcordulate; middle leaflet to 11 cm. long & its petiolule to 2.5 cm. long; fruit apically short-conic.....
P. kinabaluensis var. *agrestis*.
- 6a. Fruit apically rounded when young, later truncate, depressed at the summit; style apical when young, excentric during anthesis; stigma unequally bilobed; ovary pubescent throughout & often glanduliferous; stamens & style only slightly exserted; anther thecae elliptic; leaflets glabrous or somewhat puberulent beneath, rarely irregularly dentate & deciduously pubescent beneath.....*P. trifoliata*.
- 5a. Inflorescence with few or no foliaceous green bracts, its branchlets divaricate; flowers diffuse, not congested; pedicels 5--10 mm. long.

8. Fruit striate.

9. Inflorescence about 12 cm. long; leaflet-blades membranous, dull above, basally rounded, the intramarginal vein obscure; lateral petiolules to 7 mm. long; pedicels about 10 mm. long; fruit glabrous. *P. membranacea*.

- 9a. Inflorescence 30--70 cm. long; leaflet-blades chartaceous or subcoriaceous, dull or shiny on both surfaces, basally rounded-cuneate; intramarginal vein prominent; lateral petiolules to 4 mm. long; pedicels to 5 mm. long; fruit apically sparsely puberulent.....
P. membranacea var. *malesiana*.

8a. Fruit not striate.

10. Leaves 3-foliolate; leaflet-blades ovate, secondaries to 4 pairs; fruit apically arcuate-conic; fruiting-calyx brownish, hairy or glabrous.....*P. bambusetorum*.

- 10a. Leaves 1-foliolate; leaflet-blades elliptic-ovate, secondaries to 6 pairs; fruit apically abruptly and obtusely acuminate; fruiting-calyx green, sparsely puberulent.....*P. bambusetorum* f. *simplicifolia*.

- 1a. Flowers in short axillary cymes toward the ends of growing non-specialized branches; "young axillant leaves" and bracts yellowish.

11. Stamens and style exerted; anther thecae orbicular or sub-orbicular; fruit striate, apically slightly enlarged; leaflets densely pubescent.....*P. scortechinii*.

- 11a. Stamens and style included; anther thecae elliptic; fruit constricted above the middle, striate only below the constriction; leaflets glabrous.....*P. wolfei*.

PETRAEOVITEX BAMBUSETORUM King & Gamble, Kew Bull. Misc. Inf. 1908: 113--114. 1908.

Synonymy: *Petraeovitex bambusetorum* f. *bambusetorum* [King & Gamble] Munir, Gard. Bull. Singapore 21: 232--233. 1965.

Bibliography: King & Gamble, Kew Bull. Misc. Inf. 1908: 113--114. 1908; King & Gamble, Mat. Fl. Malay Penins. 3 (21): 1069. 1909; Prain, Ind. Kew. Suppl. 4, imp. 1, 177. 1913; H. J. Lam, Verbenac. Malay. Arch. 324, 328, & 366. 1919; H. J. Lam in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 97 & 98. 1921; E. D. Merr., Enum. Born. Pl. 518. 1921; Ridl., Fl. Malay Penins. 2: 637. 1923; Junell, Symb. Bot. Upsal. 4 (4): 97. 1934; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 60, 65, & 97 (1942) and ed. 2, 139, 145, 146, & 192. 1949; Prain, Ind. Kew. Suppl. 4, imp. 2, 177. 1958; Mold., Résumé 180, 192, 193, & 464. 1959; Turritt, Curtis Bot. Mag. 173: pl. 355 in textu. 1960; Munir, Gard. Bull. Singapore 21: 215--220, 222, 225, 227, 230--234, 236, & 248--250, map 3, fig. 6--8. 1965; Mold., Résumé Suppl. 13: 5 & 7. 1966; Mold., Fifth Summ. 1: 305 & 325 (1971) and 2: 597 & 897. 1971; Balgooy, Pacif. Pl. Areas 3: 244. 1975.

Illustrations: Munir, Gard. Bull. Singapore 21: 248 & 249, fig. 6 & 7. 1965.

A tall woody climber; branches terete, fulvous; branchlets

pale-brown, smooth; leaves decussate-opposite, 1--3-foliolate; petioles 2.5--5 cm. long; leaflets chartaceous or subcoriaceous, ovate or ovate-oblong, apically acuminate, marginally entire, basally rounded or short-cuncate, glabrous on both surfaces, reticulate-veined, usually with 4--6 (rarely 7 or 8) curvate secondaries, the central leaflet 7--10 cm. long and 3--6 cm. wide, on a petiolule 1--2.5 cm. long, the lateral leaflets 6--9 cm. long and 2.5--4.3 cm. wide, on a petiolule 5--10 mm. long; inflorescence axillary and terminal, with or without leaves, or in the axils of fallen leaves a lax cymose-thyrsoid panicle to 30 cm. long, the flowers not congested; bracts foliaceous, lanceolate, apically long-acuminate, early deciduous; bracteoles minute, setaceous; rachis very slender; pedicels about 4 mm. long, puberulent; calyx very small, about 5 mm. long, its tube 3 mm. long, externally puberulent, internally glabrous, the rim 5-lobed, the lobes about 2 mm. long, puberulent on both surfaces; corolla very small, white or greenish-yellow, zygomorphic, bilabiate, about 6 mm. long, internally glabrous, 5-lobed, the upper lip 2-lobed, the lower lip 3-lobed, the lobes elliptic-ovate, about 4 mm. long, incurved, puberulent on the margins and externally in a central band; stamens 4, about 4 mm. long, subequal; filaments glabrous; anther thecae elliptic-oblong; ovary orbicular-ellipsoid, apically sparsely puberulent; style elongate, slightly exserted; stigma unequally 2-lobed; fruiting-calyx 2--2.6 cm. long, the tube 6--8 mm. long, externally faintly ribbed, the lobes membranous, oblong, 3-veined, 1.3--1.9 cm. long, 3--5 mm. wide, reticulate, sparsely puberulent; fruit wedge-shaped (cuneate), about 7 mm. long, broader on the upper 1/3, cuneate toward the base, not striate.

This species is based on *Kunstler 8765*, deposited at Kew, according to the lectotypification of Munir (1965). The type is from a dense bamboo forest near Ulu Kevling in Perak, Malaysia. The other collection cited as a cotype in the original King & Gamble (1908) description -- *Haviland 1913* -- is now regarded as the type collection of *f. simplicifolia* Munir.

Lam (1919) cites only *Haviland & Hose 1913E* from Mt. Sugla, Sarawak, Borneo. In his 1921 work he cites no specimens at all, simply recording the species as from the Malay Peninsula and Borneo. Munir (1965) cites "*King's Collector 8765*" [apparently the same collection as the "*Kunstler 8765*" cited by him on the preceding page as lectotype of the species] from Perak, *Ridley 9065* from Sabah, and *Ridley s.n.* from Sarawak. He regards the *Haviland & Hose 1913E*, cited by Lam (above), as representing *P. membranacea* var. *malesiana* Munir.

Ridley refers to *P. bambusetorum* as a "rare" plant. The Clemenses found it growing at 5000 feet altitude in Sabah.

Material of this species has been misidentified and distributed in some herbaria as *P. trifoliata* Merr.

Citations: GREATER SUNDA ISLANDS: Sabah: *Clemens & Clemens s.n.* [Feb. 27, '32] (N).

PETRAEOVITEX BAMBUSETORUM f. *SIMPLICIFOLIA* Munir, Gard. Bull. 21: 233--234 & 250, fig. 8. 1965.

Bibliography: Munir, Gard. Bull. Singapore 21:215, 227, 233--234, & 250, fig. 8. 1965; Mold., Résumé Suppl. 13: 5. 1966; Mold., Fifth Summ. 1: 325 (1971) and 2: 987. 1971.

Illustrations: Munir, Gard. Bull. Singapore 21: 250, fig. 8. 1965.

This form differs from the typical form of the species in having only unifoliolate leaves.

The type and only known collection of this variety is *Haviland 1913* from Mount Po, Sarawak, deposited in the Kew herbarium. It should be noted that *Haviland & Hose 1913B & 1913E*, misidentified and distributed in some herbaria as *P. bambusetorum* f. *simplicifolia*, actually are *P. membranacea* var. *malesiana* Munir, the former being its type collection.

Munir (1965) points out that the secondary veins of each leaflet are usually "up to 6", the "infructescence botryoidal in general appearance", and the "fruit abruptly acuminate, apex obtuse; bracts and bracteoles absent" (in fruiting specimens). He refers to the leaves as "simple", but unifoliolate is probably the more accurate term to describe them in this compound-leaved genus.

PETRAEOVITEX KINABALUENSIS Munir, Gard. Bull. Singapore 21: 234--235 & 251, fig. 9. 1965.

Synonymy: *Petraeovitex kinabaluensis* var. *kinabaluensis* Munir, Gard. Bull. Singapore 21: 234. 1965.

Bibliography: Munir, Gard. Bull. Singapore 21: 215--220, 222, 226, 227, 234--235, 251, & 252, map 4, fig. 9 & 10. 1965; Mold., Résumé Suppl. 13: 5 & 7. 1966; G. Taylor, Ind. Kew. Suppl. 14: 102. 1970; Mold., Fifth Summ. 1: 325 (1971) and 2: 597 & 897. 1971; Balgooy, Pacif. Pl. Areas 3: 244. 1975.

Illustrations: Munir, Gard. Bull. Singapore 21: 251, fig. 9. 1965.

A woody climber to 16 m. long; branchlets pale-brown, glabrous; leaves 3-foliolate; petioles 5--7 cm. long; leaflets chartaceous, elliptic, apically usually acuminate, marginally entire, basally cuneate, shiny, the central leaflet largest, 10--15 cm. long and 3--6 cm. wide, borne on a petiolule 2.5--3.5 cm. long, the lateral leaflets smaller, 8.5--11.5 cm. long and 3--4.5 cm. wide, borne on a petiolule 5--10 mm. long; secondaries 4--6 per side, the lower ones prominent and basally slightly concurrent with the midrib, then porrect, the intramarginal vein faintly visible, confluent above the middle; veinlet reticulation prominent beneath; inflorescence axillary, cymose-paniculate, 15--25 cm. long, 3.5--6 cm. wide, pedunculate, with at least the main rachis puberulent, the floriferous branches shortly and porrectly divided; bracts foliaceous, usually at first spatulate, later elliptic, apically acuminate, puberulent but soon glabrescent, the basal ones larger, 3--4 cm. long, the upper ones 1--2.5 cm. long; bracteoles linear, 2--8 mm. long, puberulent; pedicels short, puberulent; calyx 5-lobed, 4--6 mm. long, puberulent on both surfaces; corolla pure- or lemon-yellow, bilabiate, one lip of deeper yellow color than

the other, externally puberulent, internally sparsely puberulent on the lobes only, the tube very long, 10--12 mm. long, internally glabrous, the upper lip 2-lobed, the lower lip 3-lobed, the lobes 4--5 mm. long, 2--3 mm. wide; stamens 4, subequal, inserted in the corolla-throat, greatly exserted; filaments 15--18 mm. long, basally sparsely pilose; anthers rotund or subrotund, about 0.4 mm. long; style filiform, 2--2.5 cm. long, not excentric, much exserted; stigma bilobed, the lobes equal, porrect; ovary at first oblong, later apically conic; fruiting-calyx with its tube about 8 mm. long, strongly costate, the lobes membranous, oblong-spatulate, 1.5--2 cm. long, 4--5 mm. wide, usually apically rounded, 3-veined, reticulate, shiny; fruit capsular, about 1 cm. long, broadest at the middle, apically narrowly rostrate, longitudinally striate, the upper 1/2 densely puberulent.

This species is based on *Clemens & Clemens 40561* from 5000 feet altitude on Mount Kinabalu, Sabah, Borneo, found flowering in October, deposited in the Kew herbarium. Munir (1965) cites also *Clemens 40772 & 50401*, remarking that in the latter collection the inflorescence appears to be abnormal, completely flowerless or with the flowers "transformed into [replaced by?] bracts and bracteoles". The collectors describe the plant as climbing on trees 40 feet tall "among very great trees" and comment that it has "a few tendrils!". They correctly noted "*Petraeovitex* prob. new" on the labels of the type collection.

Citations: GREATER SUNDA ISLANDS: Sabah: *Clemens & Clemens 40561* (N--isotype).

PETRAEOVITEX KINABALUENSIS var. *AGRESTIS* Munir, Gard. Bull. Singapore 21: 235 & 252, fig. 10. 1965.

Bibliography: Munir, Gard. Bull. Singapore 21: 215, 227, 235, & 252, fig. 10. 1965; Mold., Résumé Suppl. 13: 5. 1966; Mold., Fifth Summ. 1: 325 (1971) and 2: 897. 1971.

Illustrations: Munir, Gard. Bull. Singapore 21: 252, fig. 10. 1965.

This variety differs from the typical form of the species in having its leaflets elliptic or subelliptic to ovate, dull on both surfaces, basally usually rounded or sometimes even subcordate, the central leaflet-blade to 11 cm. long, borne on a petiolule to 2.5 cm. long, the ovary with a slight constriction separating the pilose and ridged apex from the glabrous lower portion, the corollas greenish-yellow, and the fruit apically more shortly conic.

The variety is based on *Gibot 18600* from near a swampy forest at Tawau, Sabah, deposited in the Singapore Botanical Garden herbarium. Munir (1965) cites also *Kostermans 8764* and *Meijer 2301* from Kalimantan. Collectors state that they have also collected the plant in sandy soil habitats.

PETRAEOVITEX MEMBRANACEA Merr., Journ. Malay. Br. Roy. Asiat. Soc. 1: 30. 1923.

Synonymy: *Petraeovitex membranacea* var. *membranacea* [Merr.]

ex Munir, Gard. Bull. Singapore 21: 230. 1965.

Bibliography: E. D. Merr., Journ. Malay. Br. Roy. Asiat. Soc. 1: 30. 1923; A. W. Hill, Ind. Kew. Suppl. 7: 183. 1929; Fedde & Schust., Justs Bot. Jahresber. 53 (1): 1074. 1932; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 65 & 97 (1942) and ed. 2, 145 & 192. 1949; Mold., Résumé 192 & 464. 1959; Munir, Gard. Bull. Singapore 21: 215--220, 225, 227, 230--232, & 295, fig. 3. 1965; Mold., Résumé Suppl. 13: 5 & 7. 1966; Mold. in Menninger, Flow. Vines 337. 1970; Mold., Fifth Summ. 1: 325 (1971) and 2: 597 & 897. 1971; Balgooy, Pacif. Pl. Areas 3: 244. 1975.

Illustrations: Munir, Gard. Bull. Singapore 21: 245, fig. 3. 1965.

A slender, woody, climbing vine, mostly (except for the inflorescences) glabrous; branches pale, terete or obscurely tetragonal, mostly 2--4 mm. in diameter; leaves decussate-opposite, 3-foliate; petioles 4--6 cm. long, glabrous; leaflet-blades membranous, pale-olivaceous, oblong-ovate to ovate-elliptic, apically acuminate or short-acuminate, marginally entire, basally usually rounded, rarely subcuneate or cuneate, glabrous and somewhat shiny on both surfaces, the central leaflet largest, 6--11 cm. long and 3--6 cm. wide, borne on a petiolule 1--2 cm. long, the lateral leaflets 5--8 cm. long and 2.5--4.2 cm. wide, borne on a petiolule 3--7 mm. long; secondaries 4 or 5 on each side, distinct, with a faint intramarginal vein looping upwards from the middle; veinlet reticulation indistinct, especially above the middle, or the tertiaries distinct; inflorescence axillary, pedunculate, paniculate, very lax, 9--25 cm. long, 6--9 cm. wide, glabrous or very obscurely puberulent, the rachis striate, the primary branches few, usually 2 on each side, spreading, the lower ones 2--8 cm. long and usually subtended by a lanceolate foliaceous deciduous bract about 1 cm. long, the upper branches without bracts; bractlets linear, 1 mm. long or less; pedicels 8--10 mm. long; calyx-tube cuneate, 3--3.5 mm. long, glabrous, 5-lobed, the lobes green, oblong, about 3 mm. long and 1 mm. wide, apically acute, obscurely 3-veined, externally very slightly puberulent, internally glabrescent; corolla obscurely bilabiate, 7--8 mm. long, 8--9 mm. wide, white, the tube about 3.5 mm. long, glabrous on both surfaces, the limb subequally 5-lobed, the lobes ovate to elliptic-ovate, about 3.5 mm. long, 2--2.5 mm. wide, apically obtuse, marginally minutely ciliate, puberulent on the back; stamens 4, included, white, subequal; filaments glabrous or with a very few glandular hairs basally; anthers ellipsoid, about 1.7 mm. long; style elongated but not exerted; stigma unequally bilobed; ovary oblong or later basally subcuneate, obscurely puberulent on the upper 1/3; fruiting-calyx with the tube about 8 mm. long, strongly longitudinally striate or costate, glabrous, the lobes oblong, membranous, apically acute, 3-veined, reticulate, 10--15 mm. long, 2--4 mm. wide, minutely puberulent on the back and margins; fruit cuneate, about 8 mm. long, broadest in the upper 1/3, longitudinally striate.

This species is based on *Ramos* 1372 from damp forests along

small streams at low altitudes, Batu Lima, near Sandakan, Sabah, collected in October or November. Merrill cites also *Ramos* 1679 from the same locality and comments that the species is characterized by its very lax, few-flowered cymes and long-pedicellate flowers, but Munir (1965) points out that *P. bambusetorum* has similar inflorescences. Merrill claims that his species differs from the latter "not only in its inflorescence characters....but also in its few-nerved leaflets and in the distinctly ribbed fruits." Munir (1965) cites only the same two *Ramos* collections.

It should be noted that *Ramos*, on the labels of the type collection, says that the "petals" were green, but it may be that he was here referring to the calyx-lobes. The *Clemenses* found the plant "scandent on fig tree" in a jungle at 5000 feet altitude.

Material of *P. membranacea* has been misidentified and distributed in some herbaria as *Sphenodesme* sp. On the other hand, the *Bünne-meijer* 7258 & 7332 and *Slooten* 2299, distributed in some herbaria as *P. membranacea*, actually are *P. trifoliata* Merr.

Citations: GREATER SUNDA ISLANDS: Sabah: *Clemens & Clemens* 50401 (Mi), s.n. [Dec. 10/31] (Bz--23071); *M. Ramos* 1372 [field no. 301] (N--photo of type, Ph--type, Z--photo of type), 1679 (W--1376643).

PETRAEOVITEX MEMBRANACEA var. *MALESIANA* Munir, Gard. Bull. Singapore 21: 231, 246, & 247, fig. 4 & 5. 1965.

Synonymy: *Petraeovitex bambusetorum* sensu Lam ex Munir, Gard. Bull. Singapore 21: 231, in syn. 1965 [not *P. bambusetorum* King & Gamble, 1908].

Bibliography: H. J. Lam, Verbenac. Malay. Arch. 328. 1919; H. J. Lam in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 98. 1921; Munir, Gard. Bull. Singapore 21: 215, 222, 227, 231, 246, & 247, fig. 4 & 5. 1965; Mold., Résumé Suppl. 13: 5 & 7. 1961; Mold., Fifth Summ. 1: 305 & 325 (1971) and 2: 597 & 897. 1971.

Illustrations: Munir, Gard. Bull. Singapore 21: 246 & 247, fig. 4 & 5. 1965.

This variety differs from the typical form of the species in having its leaflet-blades slightly thicker in texture, the secondaries up to 7 pairs, the inflorescences more lax, much longer, sometimes bearing foliaceous bracts in their early stages, the calyx pubescent also internally on the tube and lobes, the pedicels slightly shorter, and the fruit apically puberulent.

The variety is based on *Haviland & Hose* 1913B from Mount Singhi, Sarawak, deposited in the herbarium of the British Museum (Natural History) in London. Lam (1919, 1921) regarded this collection as *P. bambusetorum* King & Gamble. It should also be noted here that *Haviland & Hose* 1913 (with no letter following the numerical digits) is the type collection of *P. bambusetorum* f. *simplicifolia* Munir.

Munir (1965) cites for *P. membranacea* var. *malesiana*, in addition to the type collection, also *Symington & Kiah* 27765a from Pahang, *Hume* 7877 from Selangor, and *Haviland & Hose* 1913E from Sarawak.

The corollas are said to have been "pale-yellow" on the Symington & Kiah collection.

Citations; GREATER SUNDA ISLANDS: Sarawak: *Haviland & Hose 1913B* (Bm--type).

PETRAEOVITEX MULTIFLORA (J. E. Sm.) Merr., Interpret. Rumph. Herb. Amb. 453, 1917.

Synonymy: *Funis quadrifidus* Rumpf, Herb. Amboin. 5: 4, pl. 3. 1747. *Petrea multiflora* J. E. Sm. in Rees, Cycl., ed. 2, 27: *Petrea* no. 2. 1814. *Petraeovitex riedelii* Oliv. in Hook., Icon. Pl. 5: 15, pl. 1420. 1883. *Petraeovitex riedelii* F. Muell. ex Durand & Jacks., Ind. Kew. Suppl. 1, imp. 1, 322. 1903. *Petrea multiflora* Sm. apud Trelease, Bot. Centralbl. 138: 123. 1918. *Petreovitex multiflora* Merr. apud H. Hallier, Meded. Rijks Herb. Leid. 37: 84, in syn. 1918. *Petreovitex riedelii* Oliv. apud H. Hallier, Meded. Rijks Herb. Leid. 37: 84. 1918. *Petraeovitex multiflora* Merr. apud Stapf, Ind. Lond. 5: 39. 1931. *Petraeovitex multiflora* var. *salomonensis* Bakh., Journ. Arnold Arb. 17: 75. 1935. *Petraeovitex sumatrana* var. *salomonensis* (Bakh.) Mold., Résumé 332. 1959. *Petraeovitex sumatrana* var. *solomonensis* (Bakh.) Mold. apud Munir, Gard. Bull. Singapore 21: 239, in syn. 1965. *Petraeovitex multiflora* var. *solomensis* Bakh. ex Munir, Gard. Bull. Singapore 21: 239, in syn. 1965.

Bibliography: Rumpf, Herb. Amboin. 5: 4, pl. 3. 1747; J. E. Sm. in Rees, Cyclop., ed. 2, 27: *Petrea* no. 2. 1814; Schau. in A. DC., Prodr. 11: 620. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 338. 1858; Hassk., Neue Schl. 89. 1866; Oliv. in Hook., Icon. Pl. 15: 15--16, pl. 1420. 1883; Hemsl. in Thomson & Murray, Rep. Scient. Res. Voy. Challenger 3, Bot. 1: 110. 1885; Fawcett in Forbes, Wander. 2: 225. 1886; K. Schum. & Hollr., Fl. Kais. Wilhelmsl. 122. 1889; Warb., Engl. Bot. Jahrb. 13: 427. 1891; F. Muell., Bot. Centralbl. 50: 195. 1892; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 2: 478. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam., ed. 1, 4 (3a): 179. 1895; K. Schum., Notizbl. Bot. Gart. Berlin 2: 145. 1898; K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 527. 1900; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 1, 322. 1903; Pulle in Lorentz, Nova Guinea 8 (2): 403 (1910) and 8 (4): 687. 1912; Heyne, Nutt. Plant. Nederl. Ind., ed. 1, 4: 123. 1917; E. D. Merr., Interpret. Rumph. Herb. Amboin. 453--454. 1917; H. Hallier, Meded. Rijks Herb. Leid. 37: 84--85. 1918; Trelease, Bot. Centralbl. 138: 123. 1918; H. J. Lam, Verbenac. Malay. Arch. 324, 326--327, 329, & 366. 1919; H. J. Lam in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 97 & 98. 1921; Fedde, Justs Bot. Jahresber. 45 (1): 552. 1923; Fedde & Schust., Justs Bot. Jahresber. 45 (1): 149. 1923; H. J. Lam in Lauterb., Engl. Bot. Jahrb. 59: 97--98. 1924; H. J. Lam in Bakh. & Lam, Nova Guinea 14, Bot. 1: 172. 1924; A. W. Hill, Ind. Kew. Suppl. 6: 150. 1926; E. D. Merr., Univ. Calif. Publ. Bot. 15: 267. 1929; Heyne, Nutt. Plant. Nederl. Ind., ed. 2, 4: 1324. 1925; Funke, Ann. Jard. Bot. Buitenz. 41: 39 & 55, pl. 15, fig. 13. 1930; Stapf, Ind. Lond. 5: 39. 1931; Junell, Symb. Bot. Upsal. 1 (4): 95--97, fig. 147. 1934; Mold., Prelim.

Alph. List Inv. Names 26, 34, & 35. 1940; Mold., Suppl. List Comm. Vern. Names 9 & 21. 1940; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 2, 322. 1941; Worsdell, Ind. Lond. Suppl. 2: 214. 1941; Kanehira & Hatusima, Bot. Mag. Tokyo 56: 114--115. 1942; Mold., Alph. List Inv. Names 24 & 35. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 57, 60, 64, 66--68, 70, & 97. 1942; Mold., Phytologia 2: 108. 1944; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 2: 478. 1946; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 133, 139, 144, 147--150, 155, 162, & 192. 1949; H. N. & A. L. Mold., Pl. Life 2: 78. 1948; Mold., Biol. Abstr. 25: 3051. 1951; Mold., Phytologia 3: 421. 1951; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 3, 322. 1959; Mold., Résumé 180, 190, 197, 199, 201, 202, 204, 207, 211, 220, 295, 332, 333, & 464. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 2: 478. 1960; Turrill, Curtis Bot. Mag. 173: pl. 355, in textu. 1960; Mold., Résumé Suppl. 3: 24 & 34. 1962; Munir, Gard. Bull. Singapore 21: 215--222, 224, 228, 239--242, 250, & 256, map 2, fig. 13 & 14. 1965; Mold., Résumé Suppl. 13: 5--7. 1966; Whitmore, Guide Forests Brit. Solom. Isls. 152 & 195. 1966; Mold. in Menninger, Flow. Vines 337. 1970; Mold., Fifth Summ. 1: 305, 325, 330, 332, 333, 337, 339, 340, 350, 351, & 366 (1971) and 2: 519, 597--599, & 897. 1971; Balgooy, Pacif. Pl. Areas 3: 244. 1975.

Illustrations: Rumpf, Herb. Amboin. 5: pl. 3. 1747; Oliv. in Hook., Icon. Pl. 15: pl. 1420. 1883; Funke, Ann. Jard. Bot. Buitenz. 41: pl. 15, fig. 13. 1930; Junell, Symb. Bot. Upsal. 1 (4): 95, fig. 147. 1934; Munir, Gard. Bull. Singapore 21: 255 & 256, fig. 13 & 14. 1965.

A slender high-climbing liana or herbaceous scrambler; the stems sometimes to 3 cm. in diameter and with a girth of 7.5 cm.; branchlets tetragonal, dark-brown or coffee-color, at first tomentellous, later glabrescent; leaves decussate-opposite, compound, once or twice (sometimes unequally) trifoliolate; leaflets 3--9, often small, sometimes sessile (var. *salomonensis*); primary petiole 2--10 cm. long, very slender, glabrous; secondary terminal petioles, if any, very slender, 1.2--4.8 cm. long, glabrous; secondary lateral petioles, if any, 2--3 cm. long; petiolules subfiliform, canaliculate above, often grayish-tomentellous, 2--14 mm. long, or absent (var. *salomonensis*); leaflet-blades chartaceous or subcoriaceous, green or light-green above, light-green beneath, ovate-elliptic or ovate-oblong, apically obtusely acuminate-apiculate or retuse, marginally entire, basally obtuse to rounded or subcordate to cuneate or subtruncate, at first pubescent (especially on the venation) beneath, finally glabrescent, the central or intermediate leaflets oblong-lanceolate, often attenuate at both ends and basally decurrent, 3.5--11 cm. long, 4--6.2 cm. wide, borne on petiolules 0.5--1.5 cm. long, the lateral leaflets slightly smaller and borne on slightly shorter stalks, 5--10 cm. long, 3--5 cm. wide, basally sometimes cordulate, borne on petiolules 2--7 mm. long; secondary laterals sometimes sessile; secondary veins 6--9; inflorescence loosely cymose-paniculate, pedunculate, to about 50 cm. long and 40 cm. wide, terminal or

axillary, with the lateral branches foliose beneath, many-flowered; peduncles absent or to 1 cm. long; principal rachis tetragonal, puberulent; cymes short-pedunculate or the upper ones sessile, 3--8 mm. long, puberulent, 0.5--1 cm. wide, 7--15-flowered, tomentellous or puberulent; bracts and bractlets at base of cymes minute, linear, 1--2.5 mm. long, puberulent; bracteoles (prophylla) linear, almost half the length of the bractlets; flowers small, congested, sessile or very shortly pedicellate, scented, borne on "paniculate spikes", 4--6 mm. wide in all; calyx about 1 mm. long, 1--1.5 mm. wide, 5-toothed or 5-lobed, externally gray-tomentellous or -tomentose, internally glabrous, its tube infundibular, the lobes 5, deltoid, about 1/3 as long as the tube, pale-green, accrescent in fruit to 1.2 cm long; corolla white or whitish to yellow, its tube very short, about 2 mm. long, deeply divided posteriorly, unequally 5-lobed, externally sparsely puberulent-pubescent or glabrescent, internally villous in the throat, the lobes 5, apically rounded, slightly incurved or reflexed; stamens 4, alternate with the petals (the dorsal one absent), inserted at the throat of the corolla-tube, subequal, exserted; filaments about 1.2 mm. long; anther thecae more or less rounded; style long-exserted, glabrous; stigma 2-lobed or bifid, the lobes reflexed; ovary ovoid, apically puberulent or gray-tomentellous, otherwise glabrous; fruiting-calyx to 1.5 cm. long, the tube about 2 mm. long, strongly costate, externally puberulent, the lobes oblanceolate, to 1.3 cm. long, about 3 mm. wide, 3-veined, sparsely puberulent; fruit about 1.5 mm. long, apically broad and 4-lobed, basally cuneate, puberulent, striate, often 3- or 4-seeded.

The species is based on a collection made by Christopher Smith on Honimoa island, in the Molucca Islands. Merrill (1917) comments that "Smith's species, which has been previously considered as one of doubtful status, was excluded from the *Verbenaceae* by Schauer [1847], where, however, it manifestly belongs. The only other suggested reduction of *Funis quadrifidus* Rumph. was Teysmann's opinion, quoted by Hasskarl....., that it was in *Illigera* (*Hernandiaceae*) and Hasskarl's own opinion that it was possibly a species of *Vitis*; both of these suggested reductions are manifestly wrong."

Petraeovitex riedelii is based on a Riedel collection from Buru island, while *P. multiflora* var. *salomonensis* is based on *Kajewski* 1687 from the Kupai Goldfield, at 850 m. altitude, on Bougainville island, collected on April 11, 1930. The latter represents a form with the secondary lateral petiolules normally absent.

Smith's (1814) description and discussion of this species are of interest: "Leaves and clusters twice compound. -- Gathered in the island of Honimoa, or Honimao, by the late Mr. Christopher Smith, from whom we have an unnamed specimen. The stem is woody, climbing, branched, quadrangular, with four furrows; downy when young. Leaves opposite, on longish smooth stalks, twice ternate; leaflets on shortish stalks, ovate, undulated, entire, smooth on both sides; shining above; rather opaque and somewhat paler beneath, with a rib and veins like the former species; the terminal ones one

and a half inch long, the rest much smaller. Clusters axillary, twelve or eighteen inches long, twice compound, downy, composed of innumerable, somewhat whorled, flowers, of whose colour we can determine nothing from the dried specimen, but they appear to agree in that respect with the foregoing. Their size is rather smaller. The segments of the calyx are more contracted at the base, and its tube has ten strong ribs; whereas the other species has five principal ribs, far less conspicuous, and a number of minute crowded intermediate ones.

"Such is our plant, which accords precisely with the figure of Rumphius; but his description is less applicable. What he asserts, of the main stems splitting into four parts, and discharging a bitter limpid water, we have no means of verifying. He says the flowers are yellow, or whitish, with six minute petals and as many stamens, having in the middle a cloven pistil, like a lizard's tongue. The germen is said to turn black as it ripens; but of the nature of the fruit he gives no account. -- Notwithstanding this description, his plate exhibits the calyx in five deep segments, with others in an early state, exactly as in our specimen. There is no representation of the stamens or pistil. He describes the leaflets twice as large as we find them, and remarks that their stalks, when old, become claspers. The stems are very tough and pliant, serving for ropes. On the whole there seems little doubt that the plant of Rumphius being the same with our's, nor, though we have often had his plate and description in contemplation, do we find anything so applicable to them as this *Petrea*." He calls the plant "panicled petrea".

Collectors have found this plant growing on riverbanks and ridgetops, in rainforests and high rainforests, primary and secondary forests and swamp forests, at the margins of woods and rainforests, in open country along beaches, in open weedy rocky ground, on flatlands and in flatland woods, and in roadside regrowth, at 5--765 m. altitude, in anthesis from February to May and July to December, and in fruit in May, September, November, and December. Whitmore (1966) states that it is a common woody climber in lowland forests in the Solomon Islands. Pleyte refers to it as a common liana in the swamp forests of New Guinea, while Stone found it climbing over rocks in woody vegetation on rocky open ground in Papua.

The corollas are said to have been "white" on Brass 32643, Kajewski 1686, Pleyte 552 & 721, and Teona s.n., "greenish-white" on Stone 9714, "pale-yellow" on Brass 3998 and Fryar 3998, "yellow" on Streimann & Kairo NGF.21165, and "light-green" on Pulle 1218. On Pleyte 722 the "flowers" are described as "light-brown", but probably it is the fruit that is referred to here.

Vernacular and common names recorded for the species are "hahiat", "harharalamas", "kwalomadiko", "kwalo ngorimadiki", "kwalo ngorimadiko", "panicled petrea", "seroe wari", "seroewari", and "tali boeboe".

Floyd inaccurately describes the leaves as "trifoliate", rather than "trifoliolate", while Stone refers to them as "pinnate-

bipinnate". Munir (1965) consistently refers to them as "ternate or biternate". He elaborates: "When 3, they may be said to be 'pseudoleaflets', for each one will form two lateral leaflets and when 5, the two lower ones are 'pseudoleaflets' and so will form their lateral 'acolytes'."

It is perhaps worth mentioning that the Schumann & Lauterbach (1900) reference in the bibliography of this species (above) is sometimes cited by the incorrect titlepage date of "1901" -- the New York Botanical Garden Library received its copy of the work already on December 7, 1900.. Merrill (1917) erroneously refers to Schauer's (1847) work as published in "1857". The Foreman (1972) reference is often cited by its titlepage date of "1971". The Bakhuizen (1935) work is mis-cited by Munir (1965) as occurring in volume "17" instead of "16".

The record of this species from Duke of York island appears to refer, not to the island of that name in the Union Island of Micronesia nor to the one of that name now belonging to Chile, but, rather, according to Munir (1965) to one in the Bismark Archipelago not listed on atlases immediately available to me.

Junell (1934) observes, regarding the present species: "Bei *P. Riedelii* hingegen glaube ich drei bis vier Samen in jeder Frucht beobachtet zu haben. Bei dieser Art sind die Früchte klein, und obwohl ich mehrere verschiedene Herbarexemplare untersucht habe, konnte ich keine mit gut erhaltenen Früchten finden. Auch bei dieser Art zerfällt die Frucht nicht.....Die Samenanlagen sind... sehr hoch inseriert.....Bei *P. Riedelii* erfolgt die [Plazenten] Verwachsung etwas weiter unten. Die eigentlichen Fruchtblattränder bleiben bei dieser Verwachsung frei; sie verwachsen auch nicht mit den mittleren Partien der Fruchtblattränder."

Warburg (1891) remarks regarding the habitat noted for the species by Hollrung: "Seine Bezeichnung 'am Wasser' ist geeignet, falsche Vorstellungen hervorzurufen; wie die meisten Lianen liebt die Pflanze Waldränder. mithin auch stellen, wo der Wald an den Fluss oder nahe an die See tritt; man findet sie übrigens auch mitten im Walde."

Lam (1924) cites *Schlechter* 16944 and *Weinland* 261 & 1646 from New Guinea, *Peckel* 503, 536, & 743 from New Mecklenburg, and *Schlechter* 13737 from New Pomerania, as well as the doubtful collections: *Lauterbach* 777, *Nyman* 245, and *Wiesenthal* 66 from New Guinea. He gives its overall distribution as "Buru, Amboina, Saparua, Aru, New Guinea, New Mecklenburg, and New Pomerania". Kanehira & Hatusima (1942) cite *Kanehira & Hatusima* 12582 & 12872, giving the species' natural distribution as the Molucca Islands to New Guinea and the Bismark Archipelago.

Hallier (1918) cites *Forsten s.n.* from Amboina and *Versteegh* 1026 from New Guinea, giving the overall distribution as "Buru (nach Oliver); Saparua (nach Forbes); Aruh-inseln, n.o.-Neuguinea u. Bismarck-archipel (nach K. Schum. u. Lauterb.). Auch in 1892 gesehenes Exemplar in Herbar des Wiener Hofmuseums dürfte wohl zu dieser Art gehören". Schumann (1898) cites only *Hollrung* 106, while Schumann & Lauterbach (1900) cite *Hellwig* 387 and *Hollrung*

106 from Territory of New Guinea and Warburg s.n. from Ulu island in the Bismark Archipelago.

The present species is the only one known to Briquet (1895) who refers to it as "poorly known". It is the type species of the genus.

Munir (1965) cites the following collections: MOLUCCA ISLANDS: Amboina: Forsten s.n. Buru: Riedel s.n.; Vriese & Teijsmann s.n. Ceram: Rutten 1870. Mongoli: Atje 45. Honimoa: C. Smith s.n. Kairatu Gemba: Kuswata & Soepadmo 59. NEW GUINEA: Beccari 586; Brass 3998, 32643; Hellwing 387; Henty 10522; Ledermann 6687; Kanehira & Hatusima 12582; Millar 9714; Pleyte 552, 721, 722; Pulle 1218; Pullen 1812; Royen & Sleumer 5807, 6196; Schlechter 13737; Turner s.n.; Versteeg 1026; Weinland 261. BISMARK ARCHIPELAGO: Duke of York: Bradtke 346. New Britain: Floyd 6632; Mc Keel 1559. New Ireland: Peekel 503. SOLOMON ISLANDS: Kajewski 1686.

Lam (1921) record the species from New Zealand, but, as Tur-rill (1960) suggests, this may be an unintentional error for New Ireland in the Bismark Archipelago.

Citations: MOLUCCA ISLANDS: Amboina: Riedel s.n. [Aug. '83] (Pd, Pd). Ceram: Rutten 1870 (Bz--22040, N, Ut--81126). Honimoa: Roxburgh 152 (Mu--1705). Mangole: Atje 45 (Bz--22041, Bz--22042). NEW GUINEA: North East New Guinea: Brass 32643 (W--2392909); Fryar 3998 (Ng--6582); Hellwig 387 (Bz--22048); Streimann & Kairo NGF.21165 (Mu); Weinland 261 (Mu--3948). Papua: Schlechter 16944 (Ca--226632); B. C. Stone 9712 [LAE.53012] (Kl--16227), 9714 [NGF.53014] (Kl--16345, Kl). West Irian: D. Bergman 12 (S), 14 (S); Kanehira & Hatusima 12582 (Bz--22043); Pleyte 552 (Bz--73026), 721 (A, Bz--73025), 722 (Ba, Bz--73016, Bz--73017, Bz--73018, Bz, Ng--16952, Ng); Schlechter 13737 (Bz--22045); Van Römer 122 (Bz--22049); Versteeg 1026 (Bz--22046, Bz--25600). BISMARK ARCHIPELAGO: Duke of York: F. Mueller s.n. (Mg, N). New Britain: Floyd 6632 (Ng--16974, Ng). New Ireland: Peekel 503 (B). SOLOMON ISLANDS: Bougainville: Kajewski 1686 (Bi, Bz--22047, Bz--22048, N, N--photo, Z--photo). Ysabel: Teona s.n. [Herb. Brit. Solom. Isls. Prot. 6355] (W--2578109). CULTIVATED: Java: Herb. Hort. Bot. Bogor. XV.G.3 (Bz--26354, Bz--26355, Bz, Bz, Bz, Bz, Bz, N), XV.G.8 (Bz, N), XV.G.8a (Bz--26356, Bz--26357, Bz, Bz, N), XV.G.46 (Bz--26358, N); Herb. Mus. Bot. Upsal. s.n. [Hort. Bot. 1832] (N, S). MOUNTED ILLUSTRATIONS: Hook., Icon. Pl. 15: pl. 1420 (Ut--73478).

PETRAEOVITEX MULTIFLORA var. *PUBESCENS* (Warb.) Munir, Gard. Bull. Singapore 21: 242 & 257, pl. 17. 1965.

Synonymy: *Petraeovitex pubescens* Warb., Engl. Bot. Jahrb. 13: 467. 1891.

Bibliography: Warb., Engl. Bot. Jahrb. 13: 427. 1891; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 1, 322. 1903; H. J. Lam, Verbenac. Malay. Arch. 324, 328, & 366. 1919; H. J. Lam in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 97 & 98. 1921; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 2, 322. 1941; Mold., Known Geo-

gr. Distrib. Verbenac., ed. 1, 67 & 97 (1942) and ed. 2, 148, 149, & 192. 1949; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 3, 322. 1959; Mold., Résumé 199, 201, & 464. 1959; Munir, Gard. Bull. Singapore 21: 215, 216, 222, 242, & 257, pl. 15. 1965; Mold., Résumé Suppl. 13: 5 & 7. 1966; Mold., Fifth Summ. 1: 332 & 337 (1971) and 2: 897. 1971.

Illustrations: Munir, Gard. Bull. Singapore 21: 257, pl. 15. 1965.

This variety differs from the typical form of the species in having small, more or less basally rounded or subcordate leaflet-blades, which are sparsely pilose or subglabrous above, pubescent beneath, especially on the venation, and marginally coarsely and irregularly dentate or entire, and the calyx-tube glabrous, but the calyx-lobes puberulent.

The variety is based on *Warburg 21148* from Key island in the Molucca Islands. Munir (1965), who cites only the original collection, comments that Warburg, in his original description of this taxon, "stated that the calyx lobes are glabrous and its tube pubescent (a statement.....also repeated by Lam), but actually the reverse is the case; for, though the calyx is entirely puberulent outside as in *P. multiflora*, the lobes are hairy within and the tube is glabrous." In typical *P. multiflora* "the calyx is glabrous inside but in the fruiting calyx the lobes are often puberulent inside." Not having seen any material of this taxon as yet, I am unable at this time to verify and/or amplify the characters given so ambiguously by Munir.

Munir also admits that "The dentation and hairiness on the leaves are apparently a mark of juvenility, for later leaves tend to become both entire and almost glabrous on both sides, but so far no adult leaves were seen." The same characters, however, not been reported for the typical form of the species.

Warburg (1891) comments that his *P. pubescens* differs from *P. multiflora* "durch die starke Behaarung von Blattstiel und Blattunterseite, durch die andere Form der viel kleineren Blätter, durch die Zahnung, durch die kleineren, schmälere, achselständigen (bei *Riedelii* terminalen) Blütenstände und die kleineren und viel schmälere Zipfel des Fruchtkelches."

PETRAEOVITEX SCORTECHINII King & Gamble, Kew Bull. Misc. Inf. 1908: 113. 1908.

Synonymy: *Petraeovitex scortechini* King & Gamble ex Mold., Alph. List Inv. Names 35. 1942.

Bibliography: King & Gamble, Kew Bull. Misc. Inf. 1908: 113. 1908; King & Gamble, Mat. Fl. Malay Penins. 4: 1068. 1909; Prain, Ind. Kew. Suppl. 4, imp. 1, 177. 1913; H. J. Lam, Verbenac. Malay. Arch. 324, 329, & 366. 1919; H. J. Lam in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 97 & 99. 1921; Ridl., Fl. Malay Penins. 2: 637. 1923; Junell, Symb. Bot. Upsal. 1 (4): 97. 1934; Mold., Alph. List Inv. Names 35. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 60, 61, & 97. 1942; Mold., Alph. List Inv. Names Suppl. 1: 18. 1947; H. N. & A. L. Mold., Pl. Life 2: 82. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 148, 149, & 192. 1949;

Prain, Ind. Kew. Suppl. 4, imp. 2, 177. 1958; Mold., Résumé 180, 193, 332, 333, & 464. 1959; Turrill, Curtis Bot. Mag. 173: pl. 355. 1960; Munir, Gard. Bull. Singapore 21: 215--220, 222, 225, 227--229, 233, & 242, map 3, fig. 1. 1965; Mold., Fifth Summ. 1: 305 & 325 (1971) and 2: 597, 599, & 897. 1971; Balgooy, Pacif. Pl. Areas 3: 244. 1975.

Illustrations: Munir, Gard. Bull. Singapore 21: 243, fig. 1. 1965.

A scandent shrub or liana; branches angled, fulvous, puberulent; young branchlets pale-brown, puberulent, the youngest parts tawny-pubescent; leaves decussate-opposite, trifoliate, the young ones yellowish on floriferous branches; petioles very slender, 3.8--6 cm. long, fulvous-pubescent; leaflet-blades membranous, the central one ovate, 5--8 cm. long, 2.5--5 cm. wide, apically shortly and obtusely acute, marginally entire or undulate, basally rounded or slightly cuneate, puberulent or pubescent above, grayish-pubescent beneath, borne on a fulvous-pubescent petiolule 1.2--2 cm. long, the secondaries 4 pairs, sharply antorsely arcuate; lateral leaflet-blades similar but somewhat smaller and basally somewhat unequally cordate, pubescent on both surfaces, borne on a fulvous-pubescent petiolule 0.5--1 cm. long; inflorescence with the flowers borne in short decussate di- or trichotomous cymes on the terminal (15--30 cm. long) portion of the branchlets, fulvous, or solitary in the axils of young pale-green or yellowish leaves, 3--5 cm. long; bracts orbicular or suborbicular when young, eventually elliptic or clavate, 1.3--1.9 cm. long, yellowish; bracteoles yellowish; pedicels short; calyx fulvous-pubescent externally, puberulent within, deeply 4- or 5-lobed or split, the lobes oblong or obovate to spatulate, 0.6--1.2 cm. long; corolla bilabiate, 1.5--2 cm. long, the lobes spatulate, concave, 2--4 mm. long; stamens 4, exserted, the 2 posterior (lower) ones longer than the 2 upper (anterior) ones; filaments 6--8 mm. long; anther thecae at first parallel, later divergent; style exserted, to 15 mm. long; stigma bilobed (or sometimes trilobed when young), the lobes spreading; ovary cylindric, about 2 mm. long and wide, apically obtuse and villous, basally pilose, 2-celled; fruiting-calyx greatly accrescent, 1.9--2.5 cm. long, the tube about 6 mm. long, 3-veined, the venation reticulate, the lobes elliptic-oblong, 1.8--2.5 cm. long, scarious, 3--5-veined, reticulate; fruit capsular, oblong or oblanceolate to cuneate, apically broadest, obtuse, and pubescent, basally narrowed or cuneate, longitudinally costate or striate, 6--7 mm. long, 1- or 2-seeded, the exocarp chartaceous; seeds 1 or 2, attached to a central placenta, the testa membranaceous, the cotyledons obovate, fleshy, 3--4 mm. long, the radicle thick.

This species is based on *Scortechini* "753 or 1753" from Perak, deposited in the Kew herbarium. Collectors have found the plant growing at 1000 feet altitude, in anthesis in October.

Munir (1965) comments that "Among the species that bear yellowish-coloured young leaves, bracts and bracteoles on the flower bearing branches, this species is easily distinguished by its

pubescent leaves, exserted stamens and styles, rounded anther lobes, villous ovary in the upper part, and pubescent, non-constricted fruit which is gradually enlarged towards the apex." He cites *Alvins 1858* from Negri Sembilan, *Scortechini s.n.* from Perak, and *Symington 44092* from Selangor. He notes that "Inflor-escence produced on old wood in the axils of fallen leaves seems to differ somewhat from those described as normal, for the former are apparently specialized, limited branches of about 10--15 cm. long and two or more branches may grow from the same pulvinus." Lam (1919, 1921) cites no specimens, but records the species only from Malacca. Ridley (1923) cites only *Scortechini s.n.* from Perak, referring to the species as "Very rare". He says in his description "nerves 2 to 3 in. long, 1 to 2 in. wide", but this is obviously a stenographic or typographic error for the leaflet-blade dimensions.

Citations: MALAYSIA: Selangor: *Nur 34212* (Ca--3156, N, S, W--2157550). GREATER SUNDA ISLANDS: Kalimantan: *Endert 2426* (Bz--72605, Bz--72606, Er, N).

PETRAEOVITEX SUMATRANA H. J. Lam in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 98. 1921.

Synonymy: *Petraeovitex elmeri* Merr., Univ. Calif. Publ. Bot. 15: 267. 1929. *Petraeovitex elmeri* Merr. apud Fedde & Schust., Justs Bot. Jahresber. 59: 417, sphalm. 1939.

Bibliography: H. J. Lam in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 97 & 98. 1921; A. W. Hill, Ind. Kew. Suppl. 7: 183. 1929; E. D. Merr., Univ. Calif. Publ. Bot. 15: 267. 1929; Fedde & Schust., Justs Bot. Jahresber. 53: 1075. 1932; A. W. Hill, Ind. Kew. Suppl. 8: 178. 1933; Fedde & Schust., Bot. Jahresber. 59: 417. 1939; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 63, 65, & 97. 1942; H. N. & A. L. Mold., Pl. Life 2: 58. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 143, 145, 146, & 192. 1949; Mold., Résumé 188, 192, 193, 332, & 464. 1959; Mold., Résumé Suppl. 3: 34. 1962; Munir, Gard. Bull. Singapore 21: 215--220, 222, 224, 228, 237--239, 242, & 254, fig. 12. 1965; Mold., Résumé Suppl. 13: 6 & 7. 1966; Mold., Fifth Summ. 1: 325 (1971) and 2: 597 & 897. 1971; Balgooy, Pacif. Pl. Areas 3: 245. 1975.

Illustrations: Munir, Gard. Bull. Singapore 21: 254, fig. 12. 1965.

A climbing or trailing somewhat woody vine; stems pale-brown or gray, acutely tetragonal, about 5 mm. in diameter, smooth, repeatedly rebranched; principal internodes about 11 cm. long; branchlets at first dark-green, later yellowish-brown, glabrous; leaves decussate-opposite, once (on the ultimate branchlets) or twice trifoliate, in all 10--15 cm. long; primary petioles very slender, 2--5 cm. long, sparsely or densely puberulent; leaflets 3--11, usually 6; leaflet-blades chartaceous to subcoriaceous, ovate-elliptic, apically broadly and obtusely acuminate, marginally entire, basally rounded or acute to subcuneate, mostly inequilateral, rigid, dark-olivaceous when dry, paler beneath, glabrous or often minutely puberulent on the lower surface (especially on the midrib and larger venation) when young, less so in age, 4--7-veined, usually somewhat folded or recurved a-

pically; secondary terminal petioles 1.5--3 cm. long, densely puberulent; central leaflet-blade 3--5 cm. long and 2.8--3.5 cm. wide, borne on a puberulent petiolule 1.5--2 cm. long; lateral leaflet-blades 2--3.8 cm. long and to 2 cm. wide, borne on puberulent petiolules 2--5 mm. long; secondary lateral petioles 5--15 mm. long, densely puberulent; central leaflet-blades to 4.3 cm. long and 2.3 cm. wide, borne on puberulent petiolules to 1 cm. long; lateral leaflet-blades to 2.8 cm. long and 2 cm. wide, borne on petiolules 2--5 mm. long or sometimes sessile; inflorescence erect, pale-green (except for the corollas), axillary and terminal, narrowly cymose-paniculate, 15--30 cm. long, with lateral branches to 15 cm. long, and racemously arranged, the lowermost ones only 1.5 cm. long, densely pubescent; main rachis tetragonal, sparsely puberulent; cymes 0.5--1 cm. long, 2--5- (mostly 3-) flowered, puberulent; bracts at the base of each cyme linear, minute, about 1 mm. long, puberulent; bracteoles linear, about 0.5 mm. long or less; flowers small, congested; pedicels 1--2 mm. long, puberulent; calyx about 2 mm. long, externally puberulent, its tube infundibular, 1--1.5 mm. long, internally glabrous, the lobes 5, oblong, 0.9--1.4 mm. long, apically obtuse, puberulent; corolla yellowish, infundibular, externally glabrous, the tube broad or narrow, apically ampliate, 1.5--2.5 mm. long, sparsely glandular in the throat, the lobes 5, ovate, about 1 mm. long, subequal, slightly shorter than the tube, apically obtuse or rounded, externally glabrous, internally pubescent on the upper half, finally reflexed; stamens 4, inserted at or slightly below the mouth of the corolla-tube, about 2 mm. long, exserted, whitish; filaments slender, laterally compressed, glabrous; anthers elliptic-ovate; style filiform, 4.5--6 mm. long, glabrous; stigma bilobed, the lobes 0.5--1 mm. long; ovary oblong or suboblong, apically puberulent, slightly 4-lobed; fruiting-calyx accrescent, glabrous, the tube 3--5 mm. long, costate, including the fruit, the lobes membranous, oblong-oblancheolate or spatulate, 0.6--1.9 cm. long, 1.5--4 mm. wide, apically obtuse, somewhat 3-veined and reticulate, basally acute.

This species is based on *Ajoeb* 183 from Rimbo Pengadang, Sumatra, deposited in the Buitenzorg herbarium. The type of *P. elmeri* is *Elmer* 21883 from among herbaceous thickets in clearings on the banks of a creek near Tawao, Elphinstone Province, Sabah.

Lam (1921) cites only *Ajoeb* 131 & 183 from Sumatra. Munir (1965) cites *Ajoeb* 183 and *Voogd* 1062 from Sumatra and *Elmer* 21883 from Sabah.

The species has been encountered at 1000 m. altitude, in flower and fruit in June. Munir (1965) comments that the species is closely related to *P. multiflora* (J. E. Sm.) Merr. because of "having biternate leaves, small congested flowers [=inflorescences] [and] exserted stamens and style, but differs in having: calyx lobes almost equal to the tube and conspicuously puberulent within and without, corolla sparsely glandular at the throat, minutely puberulent in the lobes; anther lobes \pm elliptic and style longer.....In *P. multiflora* the calyx lobes are practically

glabrous within, the corolla is villous in the throat, anther lobes rounded." In *P. sumatrana*, he notes, "the leaves are comparatively short even on old stem. In *P. multiflora* small leaves are found only on young apical stems." By "leaves" he here obviously means "leaflets" or leaflet-blades.

Citations: GREATER SUNDA ISLANDS: Sabah: *Clemens & Clemens* 28348 (Bz--22050); *Elmer* 21883 (Bi, Bz--22039, Ca--312134, Du--175304, Mu, N, N--photo, Z--photo). Sumatra: *Ajoeb* 131 (Bz--22053--isotype, N--isotype), 183 (Bz--22052, N--photo, Z--photo); *Voogt* 1062 (Bz--22051).

PETRAEOVITEX TRIFOLIATA Merr., Philip. Journ. Sci. Bot. 2: 425. 1907.

Synonymy: *Petreovitex ternata* H. Hallier, Meded. Rijks Herb. Leid. 37: 85--86. 1918. *Petreovitex trifoliata* Merr. ex H. Hallier, Meded. Rijks Herb. Leid. 37: 84. 1918. *Petraeovitex ternata* var. *typica* H. J. Lam in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 97--98. 1921. *Petraeovitex ternata* var. *glabrior* H. J. Lam in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 98. 1921. *Petraeovitex ternata* H. Hallier apud A. W. Hill, Ind. Kew. Suppl. 6: 150, 1926. *Petraeovitex trifolia* Merr. ex Mold., R  sum   332, in syn. 1959. *Petraeovitex bambusetorum* "sec Merr." ex Munir, Gard. Bull. Singapore 21: 235, in syn. 1965 [not *P. bambusetorum* King & Gamble, 1908].

Bibliography: E. D. Merr., Philip. Journ. Sci. Bot. 2: 425. 1907; H. Hallier, Meded. Rijks Herb. Leid. 37: 85--86. 1918; H. J. Lam, Verbenac. Malay. Arch. 324--326 & 366. 1919; H. J. Lam in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 97--98. 1921; E. D. Merr., Enum. Philip. Flow. Pl. 3: 406. 1923; A. W. Hill, Ind. Kew. Suppl. 6: 150. 1926; Fedde & Schust., Justs Bot. Jahresber. 53 (1): 1074--1075. 1932; Junell, Symb. Bot. Upsal. 1 (4): 95 & 97, fig. 145 & 146. 1934; Mold., Alph. List Inv. Names 35. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 62, 65, & 97. 1942; Mold., Alph. List Inv. Names Suppl. 1: 18. 1947; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 142, 145, 146, & 192. 1949; Mold., R  sum   184, 187, 192, 193, 332, 333, & 464. 1959; Munir, Gard. Bull. Singapore 21: 215--220, 222, 226, 227, 235--237, 242, & 253, fig. 11. 1965; Mold., R  sum   Suppl. 13: 5 & 7. 1916; Mold., Fifth Summ. 1: 317 & 325 (1971) and 2: 597, 599, & 897. 1971; Mold., Phytologia 23: 434. 1972; Balgooy, Pacif. Pl. Areas 3: 245. 1975; Mold., Phytologia 46: 50 & 171. 1980.

Illustrations: Junell, Symb. Bot. Upsal. 1 (4): 95, fig. 145 & 146. 1934; Munir, Gard. Bull. Singapore 21: 253, fig. 11. 1965.

A large herbaceous or woody vine or liana, to 7 m. long, climbing by means of its older petioles or sometimes "with a few stout tendrils" (sec Clemens), the youngest parts ferruginous-tomentellous; branchlets acutely tetragonal, brown or "dirty-khaki" in color, 2--2.5 mm. thick, at first grayish-fuscos-pubescent or subtomentellous, later glabrescent; principal internodes to 9 cm. long; cambium pale-greenish; leaves decussate-opposite, 3-foliolate, long-petiolate; petioles very slender, 3--7.5 cm. long, often cirrate; leaflets subequal, more shortly petiolulate, the

blades membranous or chartaceous to subcoriaceous, obliquely ovate or oblong-ovate, apically conspicuously acuminate (the acumens to 1 cm. long), marginally entire or slightly undulate, basally cordulate or cordate to subcuneate, dark-green and opaque on both surfaces when dry, glabrous on both surfaces or sometimes plumose-hairy and glandulose-punctate along the midrib toward the base beneath and in the axils of the secondaries, loosely but prominently reticulate-venose above and finally slightly rugose because of the sulcate venation, the secondaries usually 4 pairs, the veinlet reticulum conspicuously prominent beneath and pinnately clathrate-lineate; central leaflet-blade 7.2--14 cm. long and 4.3--7.8 cm. wide, borne on a petiolule 1--2 cm. long; lateral leaflet-blades to 12 cm. long and to 7.5 cm. wide, borne on petiolules 0.5--1.5 cm. long; inflorescence a loose terminal thyrsoïd panicle with the lower branches axillary and also with axillary and terminal cymes; bracts and bracteoles numerous, leafy, usually caducous; flowers congested on shortly subdivided branchlets; pedicels very short, purple; calyx about 8 mm. long, puberulent (in bud externally ferruginous-tomentellous), 4- or 5-lobed, the lobes oblong-lanceolate, about 4 mm. long; corolla yellowish or greenish-white, its tube narrowly infundibular, about 5 mm. long, externally puberulent (in bud externally cinereous-tomentellous), internally glabrous below the stamen insertion, glandular-pilose near and slightly above the stamen insertion, the lobes oblong-ovate, about 3 mm. long, apically rounded; stamens 4, subequal, 4--5 mm. long, subincluded; filaments basally slightly pilose; anthers oblong, about 1 mm. long, the thecae often slightly pilose; style 4--6 mm. long, slightly exserted, at first terminal, later excentric, basally sparsely pilose; stigma unequally bilobed; ovary oblong, 3--5 mm. long, glanduliferous, the upper 1/3 externally pubescent or ferruginous-tomentellous, with 2 pendent ovules attached to the septum in each cell; fruiting-calyx greatly accrescent, its tube turbinate, 5--8 mm. long, about 3 mm. wide, strongly costate, the 4 or 5 lobes spatulate or oblanceolate-spatulate, 1.5--2 cm. long, 5--6 mm. wide, apically obtuse, reticulate-venose, basally 3-veined, puberulent or pulverulent-puberulent on both surfaces; fruit cylindric or subconic to oblong, green, 5--7 mm. long, basally slightly narrowed, apically usually ampliate and at first rounded, later truncate and depressed, longitudinally striate, the upper 1/5 pubescent, 1- or 2-seeded.

This species is based on *Foxworthy s.n.* [Herb. Philip Bur. Sci. 708] from Palawan island, Philippine Islands, originally deposited in the Bureau of Science herbarium at Manila, now destroyed. Hallier's *P. ternata* is based on *Korthals s.n.* from Borneo and Hallier 4613 & 4722 from Mindanao island. Hallier (1918) reports finding the plant growing high in the rainforest canopy and in secondary scrub with/on *Pseuderanthemum*, *Ficus*, *Pterospermum*, and *Vitex co-fassus*, sometimes associated with abundant *Arenga saccharifera*. He describes it as a "Frutex petiolarum ope scandens, passim anisophyllus" and comments that "Zur nämlichen Art gehört wohl auch Winkler no. 2756, am 8.VII.1908 mit Blütenknospen zwischen Kundim baruh und Butuh babie in s.o.-Borneo gesammelt, doch unter-

scheidet sich dieses Exemplar dadurch, dass die verzweigten Haare auf der Blattunterseite schon sehr früh abfallen und das Mittelblattchen zuweilen am Seitenrande einen kurzen Zahn oder Lappen hat."

Lam (1921) keeps *P. ternata* and *P. trifoliata* apart as two separate valid taxa, distinguishing them as follows:

P. trifoliata -- Leaflets (7) 10--12 cm. long, (2.5) 6.5--7.5 cm. wide, glabrous beneath; from Palawan and Mindanao.

P. ternata -- Leaflets only 3--6.5 cm. long, 1.6--4.2 cm. wide, with plumose hairs on the lower surface near the base.

His two varieties of the latter species he distinguishes as follows:

var. *typica* -- "Innovationes dense pubescentes; foliola adulta pilis plumosis prope basin vestita; 3--6 1/2 c.M. longa, 1.6--4.2 c.M. lata; petiolulo 0.2--0.8, petiolo 1.7--5 c.M. longo; calyx fructifer sparse pubescens", citing *Winkler* 2756 from Borneo and *Hallier* 4722 from Mindanao.

var. *glabrior* -- "Innovationes subglabrae; foliola adulta subtus subglabra; 5 1/2 --11 c.M. longa, 3.2--7 c.M. lata; petiolulo 0.4--1.2, petiolo 3.6--6 c.M. longo; calyx fructifer subglaber," citing *Nieuwenhuis* 625 from Sungei Mangn and *Nieuwenhuis* 512 & 1100 from Sungei Blu-u. These three last-mentioned collections are apparently the ones cited as *Jaheri* 512, 625, & 1100 below.

Petraeovitex trifoliata has been found growing along riversides, in logged-over areas on flatland, in primary forests on flatland hills, in jungles and montane rainforests, in dark red-brown or rocky limestone soil, at 95--2030 m. altitude, flowering in February, April, and August to December, and in fruit in February, August, and October. The corollas are described as having been "dull-yellow" on *Clemens* 10246, "lemon-yellow" on *Clemens* & *Clemens* 40772, "dark brown-yellow" on *Sinanggul* SAN.57432, "yellowish-green" on *Gibot* SAN.55366, "greenish-white" on *James* & *Ahan* SAN.65008, and "yellowish with a long green stalk" on *Krispinus* SAN.87359.

Junell (1934) comments that "Bei *P. trifoliata* verwachsen die Plazenten unmittelbar unter den Samenanlagenbefestigungen....Die Frucht....and ihren Oberfläche kann man nicht die Grenzen der einzelnen Klappen sehen oder entscheiden, viel vielsamig sie ist."

Material of *P. trifoliata* has been misidentified and distributed in some herbaria as *P. membranacea* Merr., *Sphenodesme* sp., and even *Lantana* sp. On the other hand, the *Elleh* SAN.37448, distributed as *P. trifoliata*, actually is *Sphenodesme triflora* var. *montana* Munir.

Citations: PHILIPPINE ISLANDS: Mindanao: *Reillo* s.n. [Herb. Philip. Bur. Sci. 16410] (W--714928). Palawan: *Elmer* 12892 (Bi, Bz--22064, Du--174761, N, Um--141, Ut--29140, W--872981). GREATER SUNDA ISLANDS: Kalimantan: *Jaheri* 512 (Bz--22061, N, N--photo, Z--photo), 625 (Bz--22060), 1100 (Bz--22059); *Slooten* 2299 (Bz--22054, Bz--22055, N). Sabah: *Ahwing* 47258 (Ld); *M. S. Clemens* 10246 (Ca--214982, N--photo, Ph, Z--photo), s.n. [27.II.1932] (Bz--

22062); Clemens & Clemens 40772 (Ca--541712); Gibot SAN.31314 (Z), SAN.55366 (Z); James & Aban SAN.65008 (Sn--40707); Krispinus SAN.87359 (Sn--55153); Nootekhoom 966 (Sn); Sinanggul SAN.54644 (ld, Z), SAN.57432 (ld, Z); Sitiol SAN.33419 (N). Singkep: Bünnemeijer 7258 (Bz--22057, Bz--22058, N), 7332 (Bz--22056, Bz--25601, N).

PETRAEOVITEX WOLFEI Sinclair, Gard. Bull. Singapore 15: 18, fig. 2. 1956.

Bibliography: Sinclair, Gard. Bull. Singapore 15: 18, fig. 2. 1956; Turrill, Curtis Bot. Mag. 172: pl. 355. 1960; Townsend, Excerpt. Bot. A.6: 462. 1963; Munir, Gard. Bull. Singapore 21: 215--220, 222, 225, 227, 229--230, & 244, fig. 2. 1965; G. Taylor, Ind. Kew. Suppl. 13: 102. 1966; Mold., Resume Suppl. 15: 15. 1967; Mold. in Menninger, Flow. Vines 337. 1970; Mold., Fifth Summ. 1: 305 (1971) and 2: 597 & 897. 1971; Balgooy, Pacif. Pl. Areas 3: 245. 1975.

Illustrations: Sinclair, Gard. Bull. Singapore 15: fig. 2 (in color). 1956; Munir, Gard. Bull. Singapore 21: 244, fig. 2. 1965.

A long woody climber; young branches minutely papillose; leaves decussate-opposite, 1--1-foliolate, mostly trifoliolate; petioles very slender, 2--8 cm. long, minutely papillose; petioles 0.5--2 [or 20?] cm. long; leaflet-blades membranous, elliptic or broadly elliptic to ovate-elliptic, 4--17 cm. long, 2.5--8 cm. wide, apically acute or shortly acuminate, marginally entire, basally more or less rounded or subcuneate, glabrous on both surfaces; venation reticulate, the midrib and secondaries, sub-prominent above, prominent beneath, the secondaries 4--6 pairs, mostly diverging at angles of 40°--60°, marginally anastomosing, the young leaves yellowish; veinlet reticulation distinct but rather loose; inflorescence terminal, thyrsoïd, handsomely golden-yellow, pendulous, to 50 cm. long; cymes axillary, decussate-opposite, 2--5 cm. long, 2- or 3-flowered, borne in the axils of paired foliose bracts, usually dichotomous at the first division with a central terminal flower/fruit, subsequently more irregularly branched by suppression of some flowers and branches and the persistence of only one bracteole at each division; bracts simple, distinct and leaf-like below, gradually reduced upwards, yellowish, broadly elliptic or elliptic-ovate to narrowly oblong, 8--30 mm. long, 3--13 mm. wide, apically subacute to rounded, basally cuneate, those on the main inflorescence-axis broadest, all minutely puberulent; bracteoles yellowish; lateral peduncles 0.5--1.5 cm. long, densely puberulent; pedicels short or to 3 cm. long; calyx 1.8--2.2 cm. long, densely puberulent on both surfaces, deeply 5-lobed, the lobes oblong, apically subacute to rounded or very shortly apiculate, about 1 cm. long, 4 mm. wide, with a fairly conspicuous midrib and closely reticulate side venation; corolla pale-yellow, early deciduous, 2.2--2.5 cm. long, the tube falcate, constricted about 9 mm. above the base, the lobes 5, subrotund, 4--5 mm. long, 3--4 mm. wide, apically obtuse; stamens 4, included, didynamous, two about 10 mm. long, the other two 12--13 mm. long; filaments 7--10 mm. long, glabrous; anthers

8--15 mm. long, the thecae elliptic; style slender, 1.5--3 cm. long, glabrous; stigma unequally bifid, the lobes 0.75--1 mm. long; ovary ovoid-ellipsoid to ellipsoid-oblong, about 3.5 mm. long and 3 mm. wide, slightly constricted and minutely puberulent in the upper 1/3; fruiting-calyx largest in the genus, 3--4 cm. long, the lobes with a fairly conspicuous midrib and closely reticulate side venation; fruit capsular, about 8 mm. long, conspicuously constricted above the middle, longitudinally costate below the constriction, minutely puberulent and faintly 4-lobed apically.

This species is based on *Wolfe & Kadir 21452* from Sungai Patani on the Selambau to Jeniang road, Kedah, Malaysia, deposited in the Singapore Botanical Garden herbarium. The species, according to Munir (1965), "Allied very closely to *P. scortechinii* in having yellowish young leaves, bracts and bracteoles in flower-bearing branches, puberulous calyx within and without, ovary puberulent towards apex and longitudinally striate fruit, but is distinguished easily by its glabrous leaves, non-exserted stamens, elliptic anther lobes, unequally bilobed stigma and fruit faintly 4-lobed at the apex and prominently constricted above the middle."

Munir also notes that the cultivated specimen, *Furtado 37440*, exhibits leaves somewhat different in shape and texture from the wild material. He further asserts that the petiolules in this species are 5--20 cm. long and the pedicels to 3 cm. long. These dimensions seem questionable to me -- possibly "mm." rather than "cm.", was intended.

Turrill (1960) reports that the plant prefers acid soil and is easily propagated from cuttings, flowering freely "even in a small pot."

Munir (1965) cites the following collections: MALAYSIA: Kedah: *Kiah 35972*, *Munir 1*, *Wolfe s.n.*, *Wolfe & Kadir 21452*. Kelantan: *Symington 37971*. Trengganu: *Sinclair 39901*. CULTIVATED: Singapore: *Furtado 37440*. He refers to *Kiah 35972* and *Sinclair 39901* as "paratype" collections.